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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/091,525	03/07/2002	Yoichi Nakabayashi	P290768 T2HK-01S0724	8336

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PILLSBURY WINTHROP, LLP
P.O. BOX 10500
MCLEAN, VA 22102

EXAMINER	
KIM, KYUNG DONG	
ART UNIT	**PAPER NUMBER**
2652	

DATE MAILED: 03/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/091,525	NAKABAYASHI, YOICHI	
	Examiner	Art Unit	
	Kyung Kim	2652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 March 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) *7-14,19,20 and 22* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,15-18 and 21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 March 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election of the species encompassing figures 1-4 (species a) in the reply filed on March 7, 2002 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

2. Claims 7-14, 19, 20, and 22 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on March 7, 2002.

Specification

3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 2, 5, 6, 15, 16, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heeren (US 6078158 A), in view of Ottesen (US 6067203 A) and Suzuki (US 6134667 A).

Claim 1:

Heeren discloses of a disk drive apparatus with a spindle motor which rotates a disk medium, comprising: a motor driver configured to supply a current to the spindle motor to drive the spindle motor (fig. 1: motor driver 110); a temperature sensor configured to measure a temperature of the spindle motor (fig. 1: temperature sensor 120); a disk controller connected to a host system which uses the disk drive apparatus, the disk controller providing an interface control function which controls data communication between the host system and the disk drive apparatus (fig. 1: control processor consisting of CPU 133 and memory 132); and a CPU configured to control activation of the spindle motor using the motor driver (fig. 1: CPU 133), the CPU setting, in the disk controller, information concerning the activation of the spindle motor, when the activation of the spindle motor has failed, and the temperature of the spindle motor, measured by the temperature sensor, falls outside a predetermined temperature range in which the spindle motor can be activated (see fig. 9: step 920 and step 924: status of spindle motor is cold and fails to be activated under efficient commutation phase), the information including a temperature control request used to cause the temperature of the spindle motor to fall within the predetermined temperature range, a present temperature of the spindle motor measured by the temperature sensor, and a waiting time required for the spindle motor to become activatable as a result of temperature control (see fig. 9: step 920 and step 924: temperature of spindle motor must fall above 'cold'; if not, a waiting time is enforced before setting the commutation phase advance).

Heeren does not disclose but Ottesen does disclose of information concerning activation of the spindle motor to enable the host system to acquire the information and that the present temperature of the spindle motor and the waiting time is required for the host system to report a

nonfunctional state of the spindle motor to a user of the host system (col. 9, lines 52-54: information concerning activation of, temperature of, and waiting time required are status information).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to combine the disk drive apparatus as disclosed by Heeren with communication of status information between the host and the drive as disclosed by Ottesen, the motivation being to provide the host system with information regarding the status of the disk drive (col. 9, lines 52-60).

Heeren and Ottesen do not disclose but Suzuki does disclose of temperature control that is issued by the host system (fig. 17: temperature control is handled via system management interrupts, SMI, which are processed by the CPU, the CPU being part of the host system).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to combine the disk drive as disclosed by Heeren with Suzuki's temperature control method, the motivation being to protect the disk drive from overheating (see col. 1, lines 60-65).

Claim 2:

Heeren, Ottesen, and Suzuki disclose of the disk drive apparatus according to claim 1. Heeren further discloses that the CPU determines that the temperature of the spindle motor falls outside the predetermined temperature range, if the temperature of the spindle motor, measured by the temperature sensor, is lower than a lower limit of the predetermined temperature range (fig. 4: step 404; see col. 7, lines 38-40).

Claim 5:

Heeren, Ottesen, and Suzuki disclose of the disk drive apparatus according to claim 1. Heeren further discloses that the CPU periodically sets, in the disk controller, updated information concerning the activation of the spindle motor, during the time the temperature of the spindle motor falls outside the predetermined temperature range (fig. 9: steps 920 and 924; note that the flow chart of fig. 9 is controlled by the control processor).

Claim 6:

Heeren, Ottesen, and Suzuki disclose of the disk drive apparatus according to claim 1. Heeren further discloses that a nonvolatile memory prestores the predetermined temperature range, the predetermined temperature range being inherent in a type of the spindle motor, and wherein the CPU compares the temperature of the spindle motor, measured by the temperature sensor, with the predetermined temperature range stored in the nonvolatile memory, thereby determining whether the temperature of the spindle motor falls outside the predetermined temperature range (fig. 1: control processor determines if a cold condition exists by comparing reading of temperature sensor with a predetermined temperature – control processor must inherently have non-volatile memory such as an EEPROM to store the predetermined temperature for comparison; see col. 7, lines 30-45).

Claim 15:

A storage system comprising: a disk drive with a spindle motor which is powered by a current supplied from a motor driver and rotates a disk medium (col. 4, lines 45-65); a host system connected to the disk drive to use the disk drive (fig. 1: computer 101); wherein the disk drive includes: a temperature sensor configured to measure a temperature of the spindle motor (fig. 1: temperature sensor 120); a disk controller which provides an interface control function

which controls data communication between the host system and the disk drive (fig. 1: control processor consisting of CPU 133 and memory 132); and a CPU configured to control activation of the spindle motor using the motor driver, the CPU setting, in the disk controller, information concerning the activation of the spindle motor to enable the host system to acquire the information, when the activation of the spindle motor has failed, and the temperature of the spindle motor, measured by the temperature sensor, falls outside a predetermined temperature range in which the spindle motor can be activated (see fig. 9: step 920 and step 924: status of spindle motor is cold and fails to be activated under efficient commutation phase; these steps are carried out by the control processor of fig. 1, therefore the information regarding the status of the spindle motor are set in the control processor), the information including a temperature control request used to cause the temperature of the spindle motor to fall within the predetermined temperature range, a present temperature of the spindle motor measured by the temperature sensor, and a waiting time required for the spindle motor to become activatable as a result of temperature control (see fig. 9: step 920 and step 924: temperature of spindle motor must fall above 'cold'; if not, a waiting time is enforced before setting the commutation phase advance).

Heeren does not disclose but Ottesen does disclose of information concerning activation of the spindle motor to enable the host system to acquire the information from the disk controller and that present temperature of the spindle motor and the waiting time being required for the host system to report a nonfunctional state of the spindle motor to a user of the host system (col. 9, lines 52-54: information concerning activation of, temperature of, and waiting time required are status information).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to combine the disk drive apparatus as disclosed by Heeren with communication of status information between the host and the drive as disclosed by Ottesen, the motivation being to provide the host system with information regarding the status of the disk drive (col. 9, lines 52-60).

Heeren and Ottesen do not disclose but Suzuki does disclose of temperature control that is issued by the host system and that the host system controls the heating/cooling in accordance with the temperature control request contained in the information concerning the activation of the spindle motor (fig. 17: temperature control is handled via system management interrupts, SMI, which are processed by the CPU, the CPU being part of the host system). Suzuki further discloses that the host is also connected to a heating/cooling unit, the heating/cooling unit capable of heating or cooling at least the disk drive (fig. 17: fans 21a, 21b, 21c are part of the host) and a display configured to display information output from the host system (fig. 4: example display of the setup window).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to combine the disk drive as disclosed by Heeren with Suzuki's temperature control method, the motivation being to protect the disk drive from overheating (see col. 1, lines 60-65).

Suzuki does not disclose of displaying, on the display, information which reflects the present temperature of the spindle motor and the waiting time, contained in the information concerning the activation of the spindle motor, however, it would have been obvious for a person of ordinary skill in the art at the time of the invention to display the status information obtained

by the host as disclosed by Ottesen to be displayed on the display of Suzuki, the motivation being to display status information to the user.

Claim 16:

Heeren, Ottesen, and Suzuki disclose of the storage system according to claim 15. Heeren further discloses that the CPU periodically sets, in the disk controller, updated information concerning the activation of the spindle motor, during the time the temperature of the spindle motor falls outside the predetermined temperature range (fig. 9: steps 920 and 924: the process is controlled by the control processor of fig. 1, and the temperature is continually compared against the predetermined temperature, updating the activation of the spindle motor).

Claim 21:

Heeren discloses of a method, used in a system including a disk drive with a spindle motor which rotates a disk medium, for displaying a non-functional state of the spindle motor when activation of the spindle motor has failed, the method comprising: determining, when the activation of the spindle motor has failed, whether a temperature of the spindle motor falls outside a predetermined temperature range in which the spindle motor can be activated (see fig. 9: step 920 and step 924: status of spindle motor is cold and fails to be activated under efficient commutation phase); generating, in the disk drive, information concerning the activation of the spindle motor, when the temperature of the spindle motor falls outside the predetermined temperature range (see fig. 9: step 920 and step 924: these steps are carried out by the control processor of fig. 1, therefore the information regarding the status of the spindle motor are set in the control processor), the information including a temperature control request used to cause the temperature of the spindle motor to fall within the predetermined temperature range, a present

temperature of the spindle motor measured by the temperature sensor, and a waiting time required for the spindle motor to become activatable as a result of temperature control by a host system which uses the disk drive (see fig. 9: step 920 and step 924: temperature of spindle motor must fall above 'cold'; if not, a waiting time is enforced before setting the commutation phase advance).

Heeren does not disclose but Ottesen does disclose of information concerning activation of the spindle motor to enable the host system to acquire the information from the disk drive (col. 9, lines 52-54: information concerning activation of, temperature of, and waiting time required are status information).

Heeren and Ottesen do not disclose but Suzuki does disclose of controlling, in the host system, a heating/cooling unit in accordance with the temperature control request contained in the information, thereby at least heating or cooling the disk drive (fig. 17: temperature control is handled via system management interrupts, SMI, which are processed by the CPU, the CPU being part of the host system)

Suzuki does not disclose of displaying, in the host system, a non-functional state of the spindle motor on a display, the nonfunctional state reflecting the present temperature of the spindle motor and the waiting time contained in the information.

However, it would have been obvious for a person of ordinary skill in the art at the time of the invention to display a non-functional state of the spindle motor on a display, the nonfunctional state reflecting the present temperature of the spindle motor and the waiting time contained in the information obtained by the host as status information, as disclosed by Ottesen,

to be displayed on the display of Suzuki (see Suzuki: fig. 4: example display of the setup window), the motivation being to display status information to the user.

6. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heeren (US 6078158 A), Ottesen (US 6067203 A) and Suzuki (US 6134667 A), in further view of Glorioso (US 6301105 B1).

Heeren and Ottesen disclose all the limitations of the disk drive apparatus according to claim 1, but lacks the features of claim 2. However, Glorioso discloses of a CPU determines that the temperature of the spindle motor falls outside the predetermined temperature range, if the temperature of the spindle motor, measured by the temperature sensor, is higher than a higher limit of the predetermined temperature range (col. 8, lines 6-24).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to combine the disk drive as taught by Heeren and Ottesen with the cooling method as disclosed by Glorioso, the motivation being to dissipate heat (col. 8, lines 16-18).

7. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heeren (US 6078158 A), Ottesen (US 6067203 A) and Suzuki (US 6134667 A), in further view of Nishitsuji (US 4914476 A).

Heeren, Ottesen, and Suzuki disclose of the disk drive apparatus according to claim 1, but lacks the features of claim 4. However, Nishitsuji discloses of a CPU that estimates the waiting time on the basis of the present temperature, and a change per unit time in the temperature (fig. 8).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to take Nishitsuji's disclosure of estimating a waiting time based on the present

temperature and the change per unit time in temperature, and apply it to the disk drive apparatus disclosed by Heeren, Ottesen, and Suzuki, the motivation being to estimate a waiting time to reach a specified temperature from a previous temperature.

8. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heeren (US 6078158 A), Ottesen (US 6067203 A) and Suzuki (US 6134667 A), in further view of Watanabe (US 6771447 B2).

Claim 17:

Heeren, Ottesen, and Suzuki disclose of the storage system according to claim 15., but lacks the feature of claim 17. However, Watanabe discloses of wherein a host system, a display, and a disk drive are all installed in a vehicle (see Watanabe: col. 1, lines 10-21).

It would have been obvious for a person of ordinary skill in the art to further install the host, display, and heating/cooling unit as described by Heeren, Ottesen, and Suzuki as suggested by Watanabe, the motivation being to implement a HDD-based navigation system (see Watanabe: col. 1, lines 10-21).

Claim 18:

Heeren, Ottesen, Suzuki, and Watanabe disclose of the storage system according to claim 17. Furthermore, as many vehicles have heating/cooling units capable of varying an internal temperature of the vehicle, these said units would inevitably function as a heating/cooling unit for the installed storage system.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Schirle, Smith, Flinsbaugh, Kulakowski, Ohki, and Lee are cited to show other temperature control methods and apparatuses.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kyung Kim whose telephone number is (571)272-7576. The examiner can normally be reached on Monday through Friday, 8:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T. Nguyen can be reached on (571)272-7579. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KDK 03/11/05

W. R. YOUNG
PRIMARY EXAMINER